

LISTING OF CLAIMS:

The listing of the claims is provided for the Examiner's convenience and ease of reference. It includes allowed claims 1-8 of the instant application and allowed claims 9-18 of the divisional reissue application (Reissue Application Serial Number 11/504,091).

1. (Allowed) A method for manufacturing a resin-molded semiconductor device, comprising the steps of:

a) preparing a lead frame, the lead frame including: an outer frame surrounding a region in which a semiconductor chip is mounted; a die pad for supporting the semiconductor chip thereon; support leads for connecting the die pad to the outer frame; and signal-connecting leads to be connected to the outer frame, the die pad being located below the signal-connecting leads;

b) mounting the semiconductor chip, including electrode pads, onto the die pad;

c) electrically connecting the electrode pads of the semiconductor chip to the signal-connecting leads with metal fine wires;

d) attaching a seal tape to a die assembly while adhering the seal tape at least partially to the respective lower surfaces of the die pad and the signal-connecting leads of the lead frame;

e) encapsulating the die pad, the semiconductor chip, the signal-connecting leads and the metal fine wires with a resin encapsulant; and

f) removing the seal tape, wherein the respective lower surfaces of the die pad and the signal-connecting leads are at least partially not covered with the back surface of the resin encapsulant but exposed, and

wherein the lower surface of the exposed part of the die pad is located at a level lower than the lower surface of the exposed part of each said signal-connecting lead.

2. (Allowed) The method of claim 1, wherein in the step a), a metal plated layer is formed on the surface of the lead frame.

3. (Allowed) The method of claim 1, wherein in the step d), the thickness of the seal tape is adjusted at a predetermined value such that at least part of the respective lower surfaces of the die pad and the signal-connecting leads protrude from the back surface of the resin encapsulant to reach respective desired heights.

4. (Allowed) The method of claim 1, wherein clearance grooves are formed in respective regions of the die assembly to make protruding portions of the die pad and the signal-connecting leads enter the grooves, and

wherein in the step e), encapsulation is performed while making at least part of the respective lower surfaces of the die pad and the signal-connecting leads enter the clearance grooves, thereby adjusting the respective heights of the portions protruding from the back surface of the resin encapsulant.

5. (Allowed) A method for manufacturing a resin-molded semiconductor device, comprising the steps of:

a) preparing a lead frame, the lead frame including: an outer frame surrounding a region in which a semiconductor chip is mounted; a die pad for supporting the semiconductor chip thereon; signal-connecting leads to be connected to the outer frame; and support leads interposed between the die pad and the signal-connecting leads;

b) mounting the semiconductor chip, including electrode pads, onto the die pad;

c) electrically connecting the electrode pads of the semiconductor chip to the signal-connecting leads with metal fine wires;

d) attaching a seal tape to a die assembly while adhering the seal tape at least partially to the respective lower surfaces of the die pad and the signal-connecting leads of the lead frame;

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e) encapsulating the die pad, the semiconductor chip, the signal-connecting leads and the metal fine wires with a resin encapsulant;

f) cutting off part of each said support lead; and

g) removing the seal tape,

wherein the respective lower surfaces of the die pad and the signal-connecting leads are at least partially not covered with the back surface of the resin encapsulant but exposed.

6. (Allowed) A method for manufacturing a resin-molded semiconductor device, comprising the steps of:

a) preparing a die assembly having a suction hole, a semiconductor chip and a peripheral member for the semiconductor chip;

b) attaching a seal tape to between the peripheral member and the die assembly such that the seal tape adheres to part of a surface of the peripheral member;

c) forming a hole in part of the seal tape adhered to the peripheral member;

d) sucking part of the peripheral member through the suction hole of the die assembly and the hole of the tape;

e) encapsulating the semiconductor chip and the peripheral member except for the part of the surface thereof in a resin encapsulant, with the seal tape adhered to the surface, and

f) removing the seal tape after the step e) has been performed, wherein after the step d) is finished, at least part of the surface of the peripheral member protrudes and is not covered with the resin encapsulant but exposed.

7. (Allowed) The method of claim 6, wherein in the step a), a lead frame having a die pad is prepared as the peripheral member of the semiconductor chip, and

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wherein the part of the surface of the peripheral member adhered to the tape in the step b) is the die pad of the lead frame.

8. (Allowed) A method for manufacturing a resin-molded semiconductor device, comprising the steps of:

a) preparing a die assembly, a semiconductor chip and a peripheral member for the semiconductor chip;

b) attaching a seal tape to between the peripheral member and the die assembly such that the seal tape adheres to part of a surface of the peripheral member, the thickness of the seal tape being in the range from 10 μm to 150 μm ;

c) encapsulating the semiconductor chip and the peripheral member except for at least the part of the surface thereof in a resin encapsulant, with the seal tape adhered to the surface, and

d) removing the seal tape after the step c) has been performed, wherein after the step d) is finished, at least part of the surface of the peripheral member protrudes and is not covered with the resin encapsulant but exposed.

9-15. (Canceled)

16. (Allowed) A resin-molded semiconductor device comprising:

a semiconductor chip having electrode pads;

a die pad for supporting the semiconductor chip;

inner leads each including a groove formed therein so as to define a reduced thickness portion;

connecting members for electrically connecting the electrode pads to the inner leads; and

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a resin for encapsulating the die pad, the semiconductor chip, the inner leads and the connecting members,

wherein the resin is formed both in a space between the die pad and the inner leads and in the groove; and

wherein the resin is not formed on a bottom surface of the inner leads nor a bottom surface of the die pad.

17. (Allowed) The device of claim 25, wherein the resin seals the opposite side of the bottom surface of the inner leads.

18. (Allowed) The device of Claim 25, wherein the bottom surface of the inner leads are arranged in a same plane as the bottom surface of the die pad.

19. (Allowed) The device of Claim 25, wherein the inner leads include a convex portion; and wherein the resin is not formed on a bottom surface of the convex portion.

20. (Allowed) The device of Claim 25, wherein the groove is formed by etching.

21. (Allowed) The device of Claim 25, wherein a bottom surface of the die pad includes a recess formed therein.

22. (Allowed) The device of Claim 16, wherein the groove is formed in the opposite side from the bottom surface of the inner leads.

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23. (Allowed) The device of Claim 22, wherein the resin is not formed on the bottom surface of the inner leads that is opposed to the groove.

24. (Allowed) The device of Claim 23, wherein a plurality of grooves are formed in each of said inner leads.

25. (Allowed) The device of Claim 24, wherein the inner leads are connected by the connecting members at a part of the inner leads that is interposed between two of the grooves.